

Total Hip Arthroplasty in Skeletally Immature Patients with an Open Triradiate Cartilage: Updated Mid-Term Clinical, Radiographic and Patient-Reported Outcomes

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INTRODUCTION:

Total hip arthroplasty (THA) in skeletally immature patients remains controversial, with open triradiate cartilage considered a challenge for acetabular component fixation. We previously reported excellent 5-year functional outcomes and implant survivorship in a series of patients undergoing THA with open triradiate cartilage. The current study expands this cohort to 10-year radiographic and functional outcomes.

METHODS: Our institutional Total Joint Registry was queried to identify 23 patients who underwent THA with an open triradiate cartilage between the year 2000 and 2024. Skeletal maturity was assessed utilizing the modified Oxford bone age, with triradiate scores of 1 and 2 included. Demographic, implant, and radiographic data were collected. Functional outcomes were assessed via Harris Hip Score (HHS).

RESULTS:

The previously analyzed cohort (11 patients, 12 THAs) had a mean age of 13 years, and a mean follow up of 10 years. The overall expanded cohort (23 THAs) had a mean age of 14 years, 64% were male, with average BMI 24. The mean follow-up was 6 years and mean modified Oxford bone age was 21.6. The most common indications for THA were avascular necrosis (64%), degenerative joint disease (27%), and neoplasia (9%). Preoperatively, 55% of patients utilized gait aids; all patients reported independent ambulation at final follow-up with mean HHS 92. Radiographically, 92% of implants showed stable osseointegration at latest follow up. Two acetabular components required revision for aseptic loosening; both were in original cohort patients and occurred within 1 year of index THA.

DISCUSSION AND CONCLUSION:

The present study expands the largest series of THA in patients with open triradiate cartilage. Our results demonstrate excellent functional outcomes, 92% implant survivorship, and low complication rates at mid-term 10-year follow up. These findings suggest THA is safe and durable in skeletally immature patients without the need to delay arthroplasty for closure of the triradiate cartilage.